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COST *and* MANAGEMENT

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The Canadian Society of Cost Accountants

INCORPORATED 1920

The Canadian Society of Cost Accountants
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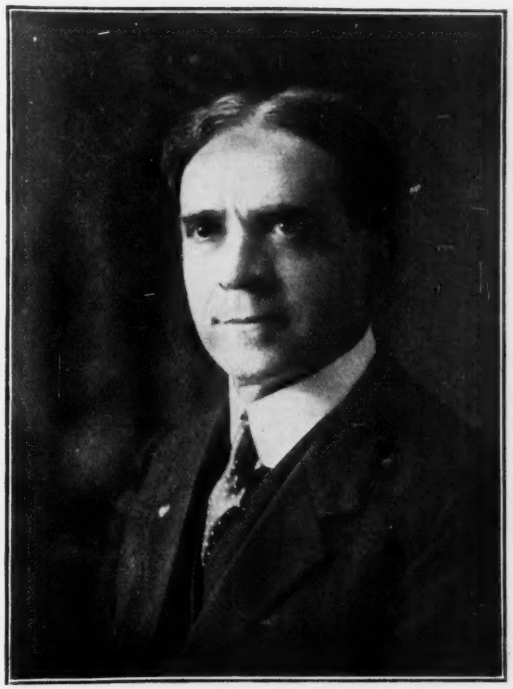

CHAIRMAN, W. G. DONALDSON

Programme, Season 1926-1927

1926		
Oct. 14—	**Cost Accounting from the Banker's Point of View.**	**J. P. Bell,** Manager-in-Chief, Canadian Bank of Commerce, Hamilton.
Nov. 4—	**The Place of Cost Accounting in Industry.**	**A. B. Green,** Dominion Envelope and Cartons, Limited, Toronto.
Nov. 25—	**Modern Cost Accounting.**	**John Craig,** President, Canadian Society of Cost Accountants, Toronto.
Dec. 16—	**Wage Incentives.**	**A. E. Keen, C.A.,** Thorne, Mulholland, Howson & McPherson, C.A., Hamilton.
1927		
Jan. 6—	**Business Cycles and Industrial Forecasting.**	**R. L. Wright, M.A.,** Vice-President, The Wahl Company, Limited, Toronto.
Jan. 27—	**Cost Accounting in its Relationship to Municipal Administration.**	**A. P. Kappele,** Purchasing Agent for the City of Hamilton.
Feb. 17—	**Depreciation in the Income War Tax Act.**	**C. S. Walters,** Inspector of Taxation, Hamilton.
Mar. 10—	**Selling and Administration Costs and their Distribution.**	**James Turner, C.A.,** The T. Eaton Company, Ltd., Toronto.
Mar. 31—	**Some Practical Advantages of Co-operation in Industry.**	**H. T. Jamieson, F.C.A.,** Riddell, Stead, Graham & Hutchison, C.A., Toronto.
Apr. 21—	**Balance Sheet, Operating and Profit and Loss Statements.**	**S. E. Le Brocq,** The Steel Company of Canada, Ltd., Hamilton.

All Meetings will be held in the Chamber of Commerce Rooms, Corner Hughson and Main Streets, at 8 p.m.

The Canadian Society of Cost Accountants
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R. R. Johnson, Henry Birks & Sons, Limited.
G. C. Leroux, Income Tax Department.
L. A. Peto, Canadian Car & Foundry Co., Limited.
F. C. McElroy, Consolidated Lithographing & Mfg. Co., Ltd.

CHAIRMAN, LORENZO BELANGER

Programme, Season 1926-1927

1926

Oct. 1—**Budgets.**

Oct. 29—**Modern Cost Methods.**

Nov. 12—**Costs in Graphic Arts.**

Direct Labor Application.

Nov. 26—**Income Tax—Administrative Rulings.**

The Operation of a Modern Cost System (Part 1).

Dec. 10—**Internal Audit of a Public Utility Company.**

The Operation of a Modern Cost System (Part 2).

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Jan. 28—**Trust Problems.**

The Operation of a Modern Cost System (Part 3).

Feb. 11—**Accounting Principles for Cost Accountants.**
Handling Stores.

Feb. 25—**Plant Depreciation.**

Mar. 11—**Subject to be Announced.**

Maintenance Costs.

Mar. 25—**Use of Costs for Better Management Practice.**

Apr. —**Annual Dinner.**
(Date, Place and Speakers to be announced).

C. Oliver Wellington, C.P.A.,
Boston, Mass.

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Canadian Society of Cost Accountants.

E. S. Richardson,
Graphic Arts Section, Canadian Manufacturers' Association.

F. Fernie,
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Canada Cement Company Limited.

H. G. Pendock,
Howard Smith Paper Mills Limited.

O. Lefebvre,
Quebec Streams Commission.

J. S. Cameron,
Northern Electric Co. Limited.

W. J. Barrett,
Metropolitan Life Insurance Co., New York, N.Y.

Meetings in Arts Buildings, McGill University, at 8 p.m.

The Canadian Society of Cost Accountants
The Toronto Chapter

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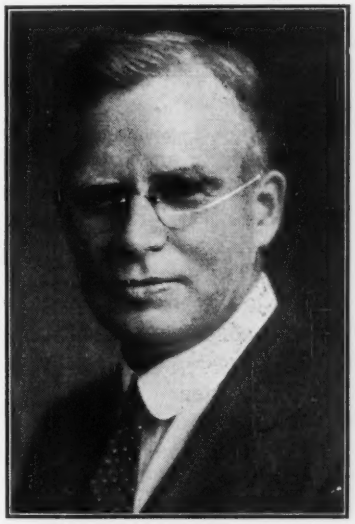

CHAIRMAN, T. S. JARDINE

Programme, Season 1926-1927

1926		
Oct. 13—	**Principles Underlying City Estimates and Budgets.**	**George H. Ross,** Commissioner of Finance and City Treasurer.
Oct. 27—	**Specific Subjects to be announced later.**	**Members of the Society.**
Nov. 10—	**Determining Materials Required; Buying and Assembling.**	**R. M. Sedgewick,** Purchasing Agent, The Standard Chemical Company.
Nov. 24—	**Plant Engineering and Handling Labor.**	**H. F. Wilson,** Production Engineer, Wilson & Fessenden, Kitchener.
Dec. 15—	**Preparation and Administration of Budget.**	**H. A. Brown,** Comptroller, General Motors of Canada, Limited, Oshawa.
1927		
Jan. 12—	**The Pulse of Business.**	**Geo. Wilson,** President, Board of Trade, and General Manager of White Pine Bureau.
Jan. 26—	**Selling and Marketing.**	**J. Allan Ross,** President, Wm. Wrigley Jr. Co., Ltd.
Feb. 9—	**The Operation of a Standard Cost System.**	**J. E. Carruthers,** Export Manager, Durant Motors of Canada, Ltd., Leaside.
Feb. 23—	**Costing Life Insurance.**	**J. H. Lithgow,** Actuary, Manufacturers Life Insurance Co.
Mar. 9—	**Factory Overheads and their Distribution.**	**C. H. Black,** Cost Accountant, Dunlop Tire & Rubber Goods Co., Ltd.
	Selling and Administrative Costs and their Distribution.	**James Turner, C.A.,** T. Eaton Company, Limited.
Mar. 23—	**Interim Monthly Statements and Annual Balance Sheets.**	**R. J. Dilworth, F.C.A.,** Clarkson, Gordon & Dilworth.

Meetings will be held in the Board of Trade Rooms, Royal Bank Building, at 8 p.m.

COST AND MANAGEMENT

OFFICIAL JOURNAL OF

THE CANADIAN SOCIETY OF COST ACCOUNTANTS

Incorporated 1920

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Vol. 1 DECEMBER, 1926 No. 4

Plant Engineering and Handling Labor

By H. F. WILSON

Of Wilson & Fessenden, Production Engineers, Kitchener, Ont.

[*A Paper read before the Toronto Chapter, November* 24]

IN the consideration of any manufacturing proposal, we find that, having arranged for the financing of such an industry, the real job then begins, that is the assembly, if you would call it so, of the vital organs of the organization which is to be created.

Firstly, one must secure an adequate place in which to carry on your operations, not only with regard to the geographical location of your plant, but also as to its peculiar fitness to the job for which it is intended.

Having built the dwelling for our project, we must next furnish it with machines required to carry out our purpose. We must provide our machines with raw material of the right kind which they are to transform into useful products, and then and most important of all, we must find, train, keep and satisfy, all those men and women who come to invest their ability, their goodwill, and their confidence in the project.

To design a new product, or adapt an old one to exactly suit the public's needs, to house the project suitably, to efficiently plan the productive equipment, and finally to operate smoothly and surely, is a task that should, and does, call out the best effort a business man is capable of. There is such great necessity for scientific exactitude in every step of the process that the longer one considers the various phases of the business, the greater is our wonder that so very many things in industry to-day are far from being definitely known as a result of recorded observation and conclusion.

Let us consider in this discussion the factors in a manufacturing business as they affect the cost of production and the general health of the project. In the location of the manufacturing plant the selection is influenced by considerations regarding (a) real estate cost, (b) proximity to raw material supply, (c) labor supply, (d) transportation facilities, (e) markets, (f) expansion room, and (g) special requirements peculiar to the particular industry.

In considering these points briefly, let me give an example of faulty location. A new plant is being built at the present time in a location which is right in the heart of the territory which will supply about one-third of their raw material. Two-thirds of the raw material will come from the seaboard, and the additional freight will represent about one cent per pound on a commodity worth about eight cents. This is about one cent more than the freight cost which competitors have who are already in the business. In addition to this, eighty per cent. of the market for sales is distant, therefore one can predict that if judged from the point of view of location only, this industry will be handicapped by:

1c per lb. on 2/3 of its product for incoming freight—2/3c net.

1½c per lb. on 4/5 of its product for outgoing freight—1 1/5c net.

Total transportation loss on every pound of product produced—1.86c per lb., or approximately 8 to 9% on the selling price.

This instance is not twenty years ago and not in South America but right here in Canada in 1926, and the opportunity for you to invest in this project is still open.

An example of wise location is the case of a factory making a product which is easily soiled and crushed, and which, therefore, requires exceedingly careful and expensive packing for express or freight carriage. Since this packing adds nearly fifteen per cent. to the cost of the article, the factory I have in mind is situated about eight miles from a large city, where one of its main markets lies, and by direct delivery of the product to the retailer the manufacturer gives quick service, has a low labor cost, and has a packing expense of about two per cent. on his cost instead of fifteen per cent. as has his competitor who is at a distance from any of the large markets.

One must consider well, therefore, what will be the effect of a much wider market as the business

expands, and what effect initial location will have on expansion and additional transportation.

In the consideration of the purchase of an existing plant, the first cost should be considered much less than last cost, by which I mean the premium one may pay in your costs for years for faulty location.

Having decided on your location, your product and your initial capacity, the question of layout and building design is to be considered. A man whose opinion I highly regard as an industrialist, once said to me: "Make your factory layout as it should be to do its best, and then put your bricks and mortar around the outside."

So often we see very ungainly businesses which should have room for their unusual limbs, cramped into conventional buildings so tightly that an army of stock-handlers and unnecessary truckers and carriers are required to minister to a lusty individual who otherwise should be able to minister to his own wants.

The actual type of building construction of course, is, to a large extent, determined by the character of the process, but you can see many instances where light products, using little or no machinery, are being manufactured in buildings of concrete and steel with the floor slab designed to carry five hundred pounds per square foot. This, of course, is a great economic waste. The cheaper the type of construction, provided it is suitable, the lower the ultimate cost of the product, which is a major objective. In fact, disproportionate building expenditure has frequently caused managements to refrain from buying productive equipment, which would for years have been great revenue producers. Perhaps we should reverse our procedure—buy our equipment, make our layout and then put up the best building we can afford to—which means just what it says. Ventilation, light, sanitary facilities, and pleasant surroundings are all important considerations in the structure of course.

With respect to layout, you are no doubt all very familiar with the use of templates in arranging departments. Every product should move as little as possible. Handling and rehandling should be at a minimum. In a certain automobile tire plant, in one department, by actual count, the product was picked up, handled, and repiled no less than an average of fourteen times, although only one productive operation was performed on the article, and a great deal of this could have been eliminated.

The very greatest of care and time should be spent on all these preliminary factors because they have a potent and permanent effect on how well your plant will produce, and how well your men will be able to do under the conditions that have been made for them.

Just here let me say a word about equipment. Only the most productive and the most modern is good enough; this of course pertains to machines which are main producers. On a machine which is rarely used or is out of the general productive flow, an adequate, even if less modern type, is an economy which can be justifiably made.

Now that we have a plant all set to go, we come to a very important point so far as its bearing on labor, and labor cost is concerned, viz.: SPECIFICATIONS FOR RAW MATERIAL. To insure uniformity both for the sake of the product as well as the labor cost, it is very important, not only in the productive raw material, but also in tools, equipment of all kinds, accessory small productive materials, etc., to adhere to definite specifications. Every time materials vary, wages vary, and factory difficulties increase. More time is often given to finding out just how to adapt the process to these changed products than is the saving in purchase price that may be claimed by an over-zealous, but under-informed purchasing agent.

Pre-supposing, however, that we now have the ideal building location surroundings, equipment and materials, how dead all this is without the right men of the right spirit, to put life and action into the sleeping giant.

How are men chosen for working in an industry? Did you ever watch the average process? It all too frequently amounts to a quick once-over and a quick "You'll do." When one stops to consider that that quick choice usually commits the business to a training expenditure of from $50 to $300 per man, we should seek to develop this all important matter to a point where at least every possible precaution can be taken, even if actual measurement values cannot yet be applied to a man's abilities. Only a real good man should choose prospective employees. Health, cheerfulness, apparent neatness, and physical activity are superficial indications of the right kind of employee. A little talk, not to, but from, the man, gives the employment man much light. Very frequently a simple eyesight test is extremely useful. Do not choose a high-grade man, who is temporarily unemployed, for a very disagreeable job. He won't stay. Pick out, for such a job, a type of laborer who wants steady work and has not the qualifications to allow him to advance much beyond his present position.

Records of employees, giving their history and so on, are somewhat useful as records, but the main thing is not keeping records, but keeping the right men in your plant. I would like to have a plant with no records of men at all, but a good enough man in the employment capacity, to choose the right workman, and choose wisely enough to have them stay hired. Records, of course, are desirable, but

the cause of men leaving employment reflects on two functions as a rule. The employment department, who hires by bad judgment, a misfit, and the management, who supplies the wage plan and the conditions of work. The employment people can pick men wrongly, but all too frequently the best men may be picked only to have unjust wages and bad conditions of management cause these men to leave.

I stated a few minutes ago that we must find, train, keep and satisfy our men, and I would like you to keep those points in mind. With regard to the training of factory labor, it is the usual custom for a green man to be put into the work with little more training than a casual startoff by the foreman. Take a typical instance of the right and wrong way of doing an operation, because there is a BEST way for doing everything. Take the sanding of a chair in the furniture business. In a recent case I saw a comparatively experienced man take eighteen minutes to do the work and handle his chair twelve times, as against an efficient man doing the work in 5½ minutes, and handling the chair just four times. If you multiply this slippage by perhaps 600 times, we can see that the cost of lack of training in this instance would be about 7,200 minutes or 120 hours, and at 40c per hour the loss on such an operation, due to improper training, would be approximately $50, and this on a very simple operation. This is not an uncommon state of affairs, and is very hard to correct when once an operator has gotten into bad and inefficient habits of work. How simple a thing it would be to have had that man start off slowly and correctly.

Take another example. The correct placing and rotation of the use of tools. Studies have been made of men building automobile tires to find out why Smith, for instance, could make 80c per hour and apparently not over-exert himself, while other men worked very strenuously to make 65c per hour. It was found that the difference when analyzed really lay in the convenience and definiteness with which tools were placed when their use was completed, in the steady thoroughness with which each operation was done—there was never any patching up—in the use of proper tools for the particular part of the operation being done. When the practice of the best operators was analyzed and codified a manual of correct operation was worked out for several standard sizes of tires and every new man who was taken in to work was under an instructor, taught to work just this way, with the result that fewer men got discouraged and quit, and those who stayed became productive much earlier in their apprenticeship.

Instances of the value of correct training could be multiplied by the score, but has industry in general to-day reached the point where a particular operation can be discussed as to the *fundamentally best* way of doing the work? There is a vast field for research in any industry in this regard, and the results of patient investigation are almost always surprisingly gratifying. Co-operation even between competitors in this field seems to be coming into its own.

Now, assuming that we have found our men, trained them and supplied surroundings that will make our men *want* to stay with us; we must endeavor to make them satisfied and contented with their pay. The best of training and working conditions will not content a man who works for a subnormal wage, under an unjust wage system, or under one where a man's individual effectiveness does not get its proportionate reward.

To the manufacturer, the wages of a machine operator may not be great, but the potential output of the machines he controls may be very great, and any failure on his part due to lack of proper incentives, may be reflected many fold in the decreased production on his machine. I have done some work recently in a business where for every $1 of wages there were nearly $3 indirectly controlled by the workman's effectiveness.

Incentives of some kind or other govern and influence most of our actions in life. If each of us here were to analyze why we take certain actions and just why we seek to progress in our business or in our social life we should find that behind all stimulation to increased activity there must first be some incentive. Ruskin says that in the last analysis love of praise or commendation is the mainspring of most of man's accomplishments.

In our businesses no doubt the reputation of successful accomplishment, the social scale on which we wish to live, the clubs and organizations to which we belong, the personal gain we may make by our industry, the service we may be to our fellows are all incentives that exercise an all-important effect on the degree of effort we put into our work. Consider the factory workers and we see that the two chief measures of his worth are: 1st. His excellence as a craftsman. 2nd. His ability as a producer.

With the advent of the modern factory system and the consequent division of labor the craftsmanship idea has been somewhat submerged, but just the same an experiment or two with the development of this incentive in mind has remarkable effects in quality and production. I refer to the plan of posting up the relative effectiveness of the men. There is, however, in the use of these comparative statements of men's effectiveness a rather harsh tone insofar as the less effective man is concerned. It makes him feel resentful, and whereas it may be argued that it will tend toward the elimination of the inefficient man, at the same time it is rather the duty of management to choose suitable

men and to properly train them rather than to dump these men into jobs and then make comparisons of effectiveness, which often show in reality—not so much the individual's comparative inefficiency—as the haphazard system of training which is responsible for many of these inequalities of individual productivity.

After all the rewards in industry, whether to a business or an individual, are measured by money, and we well know that an increase in financial reward is a gratifying accompaniment to the knowledge of a job well done. Let us look at a typical business; the owner has his incentive to added effort in the knowledge that his statement at the end of the year will reflect his energy. What a wonderful change we would see in many a business if both foreman and workman had the confidence and initiative to develop their joint effectiveness, secure in the knowledge that they, too, would benefit by their action and not the owner alone, as is too often the case. I am not advocating any profit and loss sharing scheme but simply that where the factory producers initiate improvements they should be rewarded for their effort. It is one thing to do work but quite another to do work with imagination, intelligence and vision.

To start off with, tie your foreman up with you in the conduct of your business and just see what happens. The adoption of this practice is the greatest aid to the introduction of new methods and improvements of all kinds that one can imagine. We have used this plan effectively for foreman, superintendent, mechanic, shipper, office departments, and in so many ways that the value of incentive to executives is axiomatic; but how seldom are they used, and why? There seems to be an idea that there is a hazard of some kind in so doing, that the owner is liable to get into some arrangement which he will want to get out of later on. This feeling is purely born of inexperience, and in the designing of such a plan adequate means can be taken to safeguard against any such contingency. But here again the development of such a practise involves research, courage, experience and faith.

With regard to incentives for the productive workers, experience has shown that no matter how complicated the business is, a means of measurement and consequent setting of standards can be arrived at. It is the very common experience of production engineers to find that incentive based on accurate time studies will increase the productivity by anywhere from 40% to 200%, and please remember that all this does not come from the man's effort alone; management has often to be forced thereby to supply the proper conditions, to ensure plenty of raw material, to keep tools and equipment in better shape or right away there is vigorous protest from both foreman and men. There are three things that must be done when setting production standards:—

First—To find the proper day's task for a man suited to the work.

Second—To find the compensation needed to induce men to do such a full day's work.

Third—To plan, with the interested co-operation of the foreman, so that the workman may work continuously and efficiently.

Let us consider how we may find out what is a fair day's work. Nearly every operation can be done in several ways either by varying the method or by varying the sequence of operations which frequently has a very decided effect on total time. If, then, we investigate the existing methods in use and decide on the best method according to our information, the next step is to have the operators follow this method of work. It is then that the secondary business of investigation begins. We will take the operation and divide it into sub-operations or elements, and by continued observation see what the minimum time should be, and here we shall find all kinds of contributory factors which must be eliminated. Poor tools, bad floors, poor light, poor ventilation, faulty machines, indifferent mechanical work on minor repairs, disinterested foremen and a thousand things, each shows up its quota of delay in our time study. You may say why can't the foreman correct these things. Yes, no doubt some foremen if given the time can, but to visualize the ideal condition takes experiences, persistence, time unhampered by routine work, and a degree of mental ingenuity with which the average foreman is not always gifted.

It is a remarkable example of inconsistency to find a factory measure with great exactitude the contents of the petty cash box, and hunt a week for a couple of cents in the accounts, and yet buy hundreds of dollars' worth of labor daily with either no measure of purchase or the measurement based on a foreman's best guess without any possibility of real study of the time really needed for the jobs in question.

Let me give an actual example of what may be discovered in a thorough time study.

In a certain factory in Ontario there are many thousands of articles made daily on which a sanding operation must be done on one face by holding the article on a revolving abrasive disc. In the study these questions at once tuned up as influencing the labor standard.

1. What is the right speed of the disc?
2. What is the right kind of abrasive?
3. Have we the right bonding material to hold the abrasive on the wheel?
4. Are the wheels best to rotate clockwise or anti-clockwise?
5. Would changes in design of the frame surrounding the wheel help the job?
6. Is the worker's position, height of work, and so on, conducive to best time?

A study at once revealed the fact that the foreman had been urged to see how long he could make the discs last in order to save the money which it cost to recover the discs with abrasive. By taking a few hundred pieces of equal size and having those sanded, say 50 each day, as the disc gradually lost cutting efficiency, we discovered that by the fourth day the labor cost had risen 25%, due to the dullness of the abrasive, and by the end of two weeks and a half, which was the usual time the discs were run, the time required to cut a given piece had doubled and the fatigue due to added pressure by the operator had greatly increased. This point had been missed because of the great variety of pieces sanded and nobody knew how long any given piece should take to sand under good conditions.

By frequently changing the abrasives, by changing wheel speeds, by bettering light, and rest facilities, the output was practically doubled before ever a rate was put in, and the incentive supplied to the operators subsequently reduced the cost to one-third of what it originally had been.

These results take time and patience, but imagine a busy foreman or a manager having the time to devote to such an investigation. This was a small plant, too, but it has paid remarkable dividends on the money and time so invested.

The unanimous opinion of production or industral engineers is that the facts prove beyond doubt that these economies are not by any means entirely due to the increased ability of the operative, but are much helped by more careful study and co-operation on the part of the management. In other words, the incentive of high wages for good performance induces conscious co-operation between the three human factors in industry, the owner, the foreman and the workman, to the benefit of all these parties.

It is absolutely useless to demand of your men and foreman to accomplish results without management doing its part, and I remember interviewing one manufacturer relative to conditions in his plant, and in the course of our conversation, after having gone through this plant, on being pressed for a statement as to the probable economies that could be made, I stated that it was not at all uncommon after raising the earnings of the men to an attractive level to have a net economy of 25% or more on the cost of production. The next day he called his foremen together and told them that a production expert had told him that an economy of 25% was possible in the plant, and unless they got busy and effected this, there would be wigs on the green, or words to that effect. In other words had his men an equal right to criticize the management they might as well have said to him, "unless you study our working conditions and improve them so that we can turn out 33% more work without exerting ourselves any more there will be trouble." Results in scientific matters (and this problem is one) must be attained by patient scientific work and not by drive methods. You cannot make bricks without straw. Time, patience, and education are absolute necessities to real progress in the problems of manufacturing.

A criticism that has sometimes been made of the use of modern methods of wage payment has been that the methods involved too much office work, and that the men found the methods of figuring their pay too complicated. This is a charge that is founded on lack of information largely. We had a very striking example of this just recently. In a certain factory in Ontario a number of men who came from Central Europe after they were adults and who spoke English very little, were employed in one department. None of them could be called educated although they were bright, energetic workmen. These men had been paid on a point bonus plan by which each piece of goods and each operation carried so many points. If a man scored 60 points per hour over a pay period he was paid 40c per hour, and as he raised his hourly score his pay increased in a defined ratio. There were also a number of allowances made due to the nature of the operation which made the figuring of the pay a little complicated. Every day the score of each man was posted, and if any error was made the following day one or other of these men (to whom the system was supposed to be Greek) would draw attention to the matter. Later on for certain reasons the scheme was changed to straight piecework and at the end of the first two weeks several of the men had themselves figured their pay both the old and the new way, and commented on the fact that in the transition it had made no difference in their pay envelope. We had told them we would make the pay equivalent even though the system was changed, and it is this very carrying out to the letter of one's promises that creates the confidence so essential to the conscious co-operation you wish to create.

These methods are not applicable only to a huge plant, but are just as effective in the small shop, providing the management will do their share and that adequate time is taken to do the work permanently and well.

Before closing I would like to illustrate some of the general statements I have made by referring to an actual factory in Kitchener where some of the principles I have spoken about have been tried out.

Our work at this factory started in the fall of 1924, and I shall give you some facts as to wages and labor turnover in the six months, May to October, of that year.

The whole working force was paid on an hourly basis and the average rates were as follows:—

Men	37.8c per hour
Girls	19.5c per hour
Boys	16.7c per hour

The normal working force was about 65, and during the six months mentioned above (in 1924) the number who left or were laid off was 49, and the number of new people hired to replace them was 48. There was no slack period which required a smaller working force—it was simply a case of losing help and then replacing them. 1924 was not a boom period when one expects some difficulty in holding a working force intact—it was simply an unfortunate fact that the keen foreign competition with which this company is confronted necessitates low labor costs if the factory is to stay in business. As low labor costs were forced on the company they had to pay low hourly wages—unless they could make sure that any increase in rates of wages would go hand-in-hand with higher production per operator hour. Seeing to this was our first problem.

We carefully analyzed the many complex operations in the factory by detailed time study, and with the co-operation of the foreman set piece rates which would permit the operators to take adequate time to do their work well and at the same time to increase their earnings substantially. Some operations which were not especially adapted to straight piecework were put on specially designed bonus plans until every operation in the factory, from unloading the raw material to the operation of shipping out the finished product, is paid for on an incentive basis. Our policy is to pay even master mechanics and foremen bonuses based on their success in reaching or excelling set standards of quality or labor cost, etc., for the work under their control. Very often the fact that a foreman knows that the results in his department are compared to a measured standard has more effect on his interest in his work, than has the actual bonus; but after all bonuses are appreciated by most of us.

Let us now see some of the results of all this work.

Taking the same six months of 1926 as we took of 1924 we find the following:—

Hourly rate of pay of men 46.2c instead of 37.8c as in 1924.

Hourly rate of pay of girls 25.8c instead of 19.5c as in 1924.

Hourly rate of pay of boys 20.0c instead of 16.7c as in 1924.

An advance of over 20% on the old wages.

The normal working force is now about 43 (instead of 65 as in 1924) and the production is higher.

In the six month period the number of factory employees who left or were laid off was 9 (instead of 49 as in 1924) and the number who were hired to replace them was 3 (instead of 48 as in 1924). The saving due to such a decrease in labor turnover will be appreciated by any of you who have figured out how small is the actual labor value of a green employee for the first 4 or 6 weeks on even quite simple operations.

You will readily admit that the benefit of having such an increase in wages and such a low turnover in labor is a very nice condition, and it is obviously going to be easier than before for a foreman to get the quality of work he demands now that he is dealing only with familiar experienced help who are all anxious to hold their jobs and therefore anxious to please him. However, you may wonder if the company can afford to pay these higher wages in view of the keen foreign competition I have mentioned.

Too often a manufacturer judges his labor costs by the size of the pay envelope his average employee takes home. His error is that he is too ready to measure what he pays out and too slow in measuring what he gets in return. It is easy enough to control what you pay out but quite complex to measure the work you get in return against any accurate standard. Therefore, the work end of it deserves more attention than the pay end of it and it will repay such attention. If the work is studied correctly and the rates set by a capable man then the resulting labor cost can be relied on to look after itself in spite of bigger individual pay envelopes.

The actual facts in the case of the factory I have been speaking about are that in 1924 the direct labor cost was $83.60 per ton and it is now only $63.05—a reduction of 24½%.

I have not chosen this illustration because of its peculiar features but because of its typical features. I could illustrate the same points by referring to a dozen other actual cases, and any of you who have seen similar work carried through the sometimes troublesome transition period until the new methods have in turn become old familiar methods, will recognize the story I have told in the case of this factory. It is true that like anything else worth while these methods have to be courageously backed when half the factory may be against them. It is our experience that most workmen like to go ahead on old familiar routine even if the old familiar routine is heading them for unemployment due to the factory not being able to meet more progressive competition. The encouraging feature is that these new methods soon become old familiar routine in their turn and, as such, receive the support of the same men who objected to their introduction.

Costing and the Administration of Industrial Enterprises

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[*Report of a Lecture Delivered to the Liverpool Branch of the Institute.*]

IN these latter days, when the natural resources of the whole world are more available than ever before, when markets are world-wide, when scientific discoveries and mechanical inventions have accumulated to an unheard-of pitch, when labor is abundant, and the standard of desired material comfort the world over was probably never so high before, implying great potential demand for almost every type of commodity, both at home and abroad, it would seem that the one thing needful to bring all this rich treasure to the happy haven of general content is high industrial administrative ability. The potential labor is available, the resources are available, the inventive genius is available— but the question is: Is the available administrative ability equal to all these new demands which are to be made upon it? The situation is a challenge to our commonsense and powers of higher direction.

But it must be admitted that the situation is a difficult one.

It may be comparatively easy to navigate the ferry-boat across the Mersey—though foggy days don't help that; it is another thing to navigate a great liner through storm and sometimes typhoon, half around the world. It was comparatively easy to manage the small old-fashioned one-man business; it is another thing to administer the great far-flung undertakings of to-day, amidst the fierce blasts of international competition, undertakings with their complicated threads, tangled like a skein of wool, running out to every quarter of the globe. The old-fashioned methods of *el ojo del maestro* — the eye of the master—sufficient where the range of things could be covered by the master's eye—are inadequate; even the good old random methods of trial and error, hit or miss, are often dangerously expensive and may entail needless waste. Confronted then with this problem of administration in the larger industrial concerns of to-day, what is the perplexed would-be administrator to do? He cannot be everywhere at once; he cannot with his physical eyes see everything at once, or perhaps at all, he must depute many of his duties, and yet he must keep control. How shall he extend himself, as it were, over its whole range? The range of his vision needs to be both wide and deep—an unusual accomplishment. How shall he best organize his business to give him this, and how best keep an effective controlling grip on every part of it?

That, it seems to me, is the problem, and that is just the problem which this new science and art of cost accountancy comes to solve; and that, in turn, shows the importance of such a meeting as we are holding to-night.

This new profession, for such when it obtains its charter at least I presume it will be, is a quite separate branch of the accountancy profession—almost a creation of the Great War.

But before we consider the use of costing in industrial enterprises, let us, in the first place, look for a few minutes at the general problem of administration—analyze it and see of what essentially it consists.

Suppose one is founding a new business, it depends first upon a happy conception of some real or fancied want in society. It may be a known want or it may be that it has to be revealed to its appropriate public, as in certain works of art or in the creation of new fashions. This, of course, is where the first genius of the administrator comes in—a capacity for apprehending these wants and half-wants.

It may be that the company is to develop natural resources— such as coal or iron ore—or it may be the putting on the market of a new material such as artificial silk. The financial speculator comes in here also and may be useful or may not. Company promoters proverbially look through rose-colored glasses, but they must be left to the chartered accountant. The Cost Accountant usually does not enter until later.

Suppose, then, this administrator or business man starts off with his idea—he has now got two great things to do: first, to produce the goods; second, to sell them—at a profit! Administration proper, of course, starts here.

Having learnt—through the inherited genius of the race, or from some pioneer inventor (possibly, but not very likely to be, himself)—how this product is to be achieved, he must find his land, erect his works, buy his plant, engage his work people, and set about operations.

When he has engaged his work people he must group them and specialize them under their respective duties according to their abilities. He must buy (probably) raw material of many kinds, and produce and market his finished commodity.

Here, then, with the necessity for the organization of all these requirements, is the great field for the administrator. This is the problem of management.

I have spoken as though the problem related chiefly to the founding of a new works. But the problem exists to a great, if not a greater, degree in countless numbers of old works and businesses all over the country. It is indeed complicated in these older businesses on account of their very age encumbered with old buildings, antiquated processes, and conservative workmen and managers. The early date at which British business enterprise commenced is indeed a fetter on it to-day. From administrative, as from other points of view, an entirely new works in a green field starts with many advantages which an old works cannot possess. Indeed the charge of poor industrial management, heard on many hands to-day, is closely bound up with imperfect structural inheritances from the past. In the mining industry, for instance, the miners say that with more forethought on the part of the management in the years gone by, more modern methods of getting and hauling coal and of taking the miner to his work, better systems of transport and distribution, his wages could be raised to the point of a satisfactory degree of comfort. They say point-blank that administration is weak. Similar charges are made from time to time against almost every industry. At the present moment, it is unnecessary to examine them in detail, and we need not believe that they are all true. There is, in fact, much to be said on the other side. It is sufficient to know that there is some proof in these charges, and we may accept as a fact the statement that in many cases management is poorer than it needs to be.

To what must this be attributed? I would say—first and foremost—imperfect knowledge of the facts of production, due to imperfect scientific knowledge, leading to great waste of resources, raw materials and time; and, secondly, and combined, with this, a lack and distrust of logical thought.

In the great "Inquiry Into Production" recently made by the International Labor Bureau in Geneva, it is pointed out very truly, but very necessarily, that you cannot explain the facts until you know the facts. The first duty of management or administration is to ascertain what the facts are—pleasant or unpleasant, simple or complicated.

And the difficulty of knowing the facts in a great industrial concern is multiplied a hundredfold by the further consideration that these same "facts" are constantly changing. Industrial life is a kaleidoscope—in which everything is constantly in motion, in extraordinary and new ways, and a picture of these facts, true to-day, is often untrue tomorrow.

The dazzled and bemused administrator may well be troubled in his endeavor to extract sense out of those always complicated and continually changing conditions. What shall he do to keep his venture always at the highest pitch of economic efficiency? Trust to luck, apply the lash all round, or "wait and see"?

My view is that the days for amateurish attempt at management are gone—the time for hasty surmise and the haphazard guessing at facts is gone, probably never to return. Management itself in many cases needs tightening up and the person needed to find the facts for sound administration—and to keep a track of their continual changes—is the Cost Accountant.

Let us look for a few moments at the three main channels along which management activity must realize itself—buying, producing, selling.

The administrator of a great enterprise has not himself to perform any of these operations. He may have first to select his departmental managers and then to arrange for the general method of performance of their duties and to exert some kind of control over it. He must organize for these things and he must have a check on what is being done.

Let us start with the operation of buying.

In all manufacturing businesses the administrator must buy raw material and frequently many other materials to be used up in the process of manufacturing. Leaving on one side the knowledge he needs of produce and other markets, he must be very certain of his own requirements. He must not hold up any department owing to absence of the necessary material, nor, on the other hand, must he keep too large stocks.

Now, what I may call the bye-product advantages of a Costing System may be of the utmost use to him here, and this is also a point showing the necessity for the co-ordination of the work of the Works Accountant and the Cost Accountant.

A system must be instituted which, by cards or otherwise, will show him his stock of each commodity at any moment. The Works Manager or other competent person must determine what is a normal stock of each commodity. Some relation must also be made between the Planning Department, which knows the programme of work before the works, and the Buying Department.

As the Cost Accountant must use these figures, or to speak more accurately, the booked figures showing consumption, for his costs, and must be master of the general internal works organization, to me it seems obvious that he is the person to superintend the method of treatment of all these matters. A statement—weekly, if necessary—showing stocks of each commodity, and the last month's consumption can be prepared, passed to the Planning or Programme Department, and buying orders can be made out accordingly for submission to the Works Manager. Quotations, with particulars of discount terms, may pe passed by

the Cost Accountant for comparison one with another, after these necessary and varying discount adjustments.

You will see that what I suggest is that the Cost Accountant having so much to do with these things can well be utilized, if he is allowed the scope, in doing a little more and systematizing matters for the best buying.

Accurate stock records are essential from every point of view—the control of valuable material, the necessary information for buying and the periodical checking of consumption records.

Looking at an entirely different problem of buying—take the question of the equipment of a works, its reconstruction or its extension—the Cost Accountant properly set on, is again of the utmost utility. Plans may be drawn up and schemes worked out by highly ingenious engineers and chemists, but they should not be accepted by the wise administrator until they are checked by the Cost Accountant.

Inventors of new processes, originators of new types of machines, patentees, are people for whom I have great admiration—but I always watch them! They are apt to look through rose-colored spectacles. Before the completion of the contract, the particulars of the cost equipment and an estimate of running costs should be submitted for checking, so that the net profit-ability of the change can be ascertained.

Now what is the fundamental problem in production the world over? Surely, increased output at reduced cost.

In considering the variation in output per worker per annum over a term of years—particularly those immediately after the war—many forces will be found to have been operating.

Take two industries, for instance—the coal trade and what the French call *"hauts fourneaux"*—blast furnaces.

In the coal trade the tendency has recently been reduction in the output per man. There was a marked falling off in the years immediately following the war, due to all sorts of subtle causes besides that of the shorter day. In 1921, for instance, the output per worker in tons per annum in the British cotton trade fell to 55 per cent. of what it was in 1913. It has, of course, since risen, but there are deep underlying reasons for this variation which need psychological and political investigation, as well as that of the Cost Accountant. In the United States, where the output per man is much greater both for anthracite and bituminous coal, the output per worker per hour has increased since 1913. Take a case such as the output of steel in the United States: owing to improvements in methods of production, whilst the number of workers in 1850 was 20,298, in 1919 it had only increased to 38,243, yet the tonnage production had gone up from 504,245 to 31,015,364. Whilst the number of workers is not double that of 1850, the production is sixty times greater. These figures, together with a large mass of similar information for all the greater industries, may be found in a monumental work (prepared only in French) by the International Labor Bureau.

This work, to which I would like to draw attention, was carried out by an exceedingly able Swiss and his associates, and is an excellent example both in exposition and the setting out of tables and graphs of just the type of work which a Cost Accountant should be capable of doing. It does not, of course, deal with the difficult questions of cost, but merely with total production, output per worker, and hours of work, although it has excellent chapters in extension of the facts, such as the lack of raw materials, the lack of implements, the lack of transport, the lack of capital, the lack of markets, currency crisis, etc.

Anyhow, the point I wish to emphasize is that the great problem of administration is to obtain increased output and reduced cost, and that all kinds of reasons are operating for and against both.

The problem of the industrial administrator surely is to set the world to work in the best possible way for the utilization of its material resources and the production of the most and best products for universal need. This is no place to discuss the merits of the present individualistic capitalistic system for obtaining that end, but it is always well that that end should not be lost sight of and a full stop made at the intermediate stage of individual profit. Individual profit is a necessary and important bye-product of the operation. So that, assuming what we shall turn to in a few moments, that he has found a real demand or created one, his problem on the manufacturing side is increased output at reduced cost. To take increased output first, always assuming available orders—what must he do? I contend that he must study every process of manufacture in the greatest detail. And I am quite willing to believe that the first person who must do this must be the technical man—the engineer and the chemist. This country led the world during the nineteenth century with its engineers and its chemists. In railroads, shipping, heavy engineering, they were easily first—as they were in textiles and machinery for textiles. In chemistry they carried out much of the research work, some of which was put to practical uses and some of which was not. Some of the leading chemical industries in this country are based on that work—reinforced by the work of German, Swiss and French chemists. But there has been a tendency to let some of the patient, sys-

tematic analytical work be pursued by foreign chemists working in direct connection with industrial firms. There are industries in this country sadly lacking the direction which trained chemists could give them.

But my point is that whilst the administrator needs and badly needs in many industries the work of a chemist, he needs also the Cost Accountant to tell him the probable financial results of the adoption of his suggestions.

Having found the best process, he must proceed to study the question of output wrapped up with the question of labor. Here, too, he needs the careful records which the Cost Accountant can give him and he needs to consider these from the equipment point of view, and the personal works point of view.

The Cost Accountant, in collecting his information and brooding upon it, as he needs must, is almost bound to form conclusions or at least to get ideas on the efficiency of the organization from the man point of view, and also must master and understand the various methods of payment. He must have the data necessary for judging rates of pay. In this case, too, he can summarize and classify his results for further discussion, if necessary, with the rate-fixing department—if this exists.

In cases of trade disputes he should be especially valuable as an expert but independent man.

Take the next point. In every industry he will almost certainly find steam used—sometimes for power, sometimes for process work—and almost certainly electricity. He may be able to show this in departments and he may be able to compare steam costs with electricity costs. Here, too, he will need the assistance of an experienced engineer; separately they will accomplish little—working together, a great deal.

So much, in brief outline therefore he will be able to do from the Works Management point of view, and that it needs doing I think anyone who takes a comprehensive view of world trade must agree.

If one looks at this question of production in a wide sense, one will find very disquieting statistics relating to almost, though not quite every, industry. The dislocation caused by the Great War has been enormous. The United States, with their almost inexhaustible resources, have sprung ahead in an amazing fashion, and in some fields have become a formidable competitor. On the other hand, European competition in other industries has also greatly increased. Take the figures for the iron and steel trade. In the three pre-war years our excess of exports over imports was about 230,000 tons per month; in 1924 it was 119,000 tons, and for the first eight months of this year 73,000 tons.

It is true that for October it went up to 150,000 tons again, but it remains to be seen if this will be maintained. In this trade there has been a remarkable turnover in the direction from which imports have been received—due largely to exchange reasons. The following figures are given in the Manchester Guardian Commercial of 3rd December, 1925:

MONTHLY AVERAGE IRON AND STEEL IMPORTS

Excess per month	1913 Tons	1924 Tons	June, July, August, 1925 Tons
Belgium, Luxembourg and France	59,713	144,293	155,000
United States	12,840	2,743	2,600
Germany	99,811	22,272	17,000

I am aware, of course, that other causes than efficiency, either of management or labor, are at work in frequently preventing either large total outputs or output per man in this country at the present time.

But I am anxious to stress the point that given any conditions of good or bad trade, the careful watching of the production, its method and its speed, is a first-rate necessity. It is connected also with the natural desire of the working man to earn each week a living wage, and if possible to increase rather than decrease his standard of comfort. And this human point of view must not be overlooked.

It is of the first importance, indeed, that the Cost Accountant, attempting to get out figures of output for the use of the management, should win the confidence of the workingman. He must not be allowed to think that these figures will be used necessarily against him. The screw, if it is put on, must be put on rationally and reasonably. The management must look to it that conditions for this increased output are all they might be. We have heard much—especially since the war—of industrial fatigue and its elimination or reduction, and to my mind the line of advance for the industrial administrator is in the elimination of unnecessary or wasteful processes, the education of the workman and the reduction of fatigue.

In all these things, however, the Cost Accountant by a proper subdivision and classification of his figures, can be of the utmost use. He can so arrange his figures or so interpret them that the important points are brought out.

But up to now we have been assuming a steady flow of orders coming into the works and the problem of dealing with them when they arrive. Many a perplexed administrator to-day will tell you that he has no difficulty in dealing with orders when they arrive, but what either makes him perspire or gives him cold feet—according to his temperament—is the lack of orders! And, curiously enough, this lack of orders goes with a general increased capacity for production from the equipment point of view.

Indeed, one of the troubles from which we seem to be suffering is the extraordinary productive capacity of modern machinery, providing for a potential growth in production much greater than market demand.

Lord Playfair, writing so long ago as 1888 in the Contemporary Review, said even then that "the improvements of machinery used in production have increased the supply of commodities beyond the immediate demands of the world," and in a report of about the same period of the English Commission on the depreciation of trade and industry, it was stated "that the demand for commodities does not increase at the same rate as formerly, and that our capacity for production is consequently in excess of our home and export demand, and could moreover be considerably increased at short notice by the fuller employment of labor and appliances now partially idle."

In other words, the productive capacity for machinery is so great that the most important problem in industry to-day appears to be not so much how to increase our output—important though that is—but how to find an outlet in effective demand at home and abroad. It is true, of course, that this is wrapped up with the question of price and that increased production generally means reduced price and frequently with reduced price—but not always—there will be increased demand.

The Cost Accountant is, of course, the man to ascertain the extent to which this increased production reduces cost.

But some gentlemen may say that I have so far been talking about management and only works management—a somewhat lesser thing than administration. I am inclined to agree with them, but we English are not too precise in our use of these terms, and it seemed desirable in speaking of administration to say a few words about this very important part of the larger subject. The word "administration" is perhaps better kept for the policy-directing end of a business, which must be in closest touch with its Sales Department; and the word "management," unless specially prefixed by the word "general," to the management and getting out of the business when it has been obtained. I think I am in order, however, because this top general management must exercise an oversight over both the producing and buying ends and see that its own general regulations are carried out. And it is just as the agent of this top administration in the exercise of this oversight that the Cost Accountant can best assist them.

But what shall we say now of the relation between the Cost Accountant, the Sales Manager and this top management?

After all, this administration is largely occupied with the laying down of a selling policy, the appointment of salesmen and agents, the opening of selling branches, etc., and it may be well to consider what the Cost Accountant can do with regard to that policy.

In this case his exact duty will depend upon the nature of the industry. Industries vary greatly; it may be one which depends on fashion, a fashion which is constantly changing; it may be one attacked by the invention of a new process or it may be subject to extraordinary competition by the discovery of new sources of supply of raw material abroad. It may sell under large specifications for engineering plants, or it may deal in specialties; it may sell to large wholesale houses, or it may go direct through its own travellers to retail shops; it may sell battleships for British or Foreign Governments or it may be a bakery.

Obviously the same system of even directing sales will not apply to all these and equally obviously the work of the Cost Accountant will be varied. Nevertheless, there are certain underlying general principles capable of statement, which may be applied to all of them.

Let us assume, however, neither extreme—neither the builder of battleships nor the proverbial toffee-shop—but a business of moderate or fairly large proportions dealing in a number of commodities. Of such businesses the number is legion, and the principles useful for these may, with some adaptation, be applied even to the extremists.

The first point again is the necessity for information; the administration itself, or its sales manager, will need to be constantly backed up with this up-to-date information—information relating to progress, achievement and future prospects, broken up into all sorts of divisions for better handling and the location of weaknesses.

Much of course, depends upon the Sales Manager or Administrator himself.

It means in the first place that the Administrator must take a survey of world markets and be able to gauge probable demand. For this purpose he must be fortified with news from his agents abroad and with export and import statistics of British and Foreign Governments. This information will need classifying, and it may be, and I am not suggesting that the Cost Accountant should directly undertake this work, but it may well mean that the results of it should be summarized against the firm's own exports to these countries and when we are dealing with the figures of the firm itself we are getting very close to work, which must be done either by the Cost Accountant or in close conjunction with him. The reason for this is fundamental, viz., that unless the figures are prepared after taking a wide survey of what is required with well thought-out ends in view, they may easily be prepared twice or three times over, and the result be even less useful

than one preparation if it is thoroughly thought out and co-ordinated in the first place. But someone may say "Why do you suggest the Cost Accountant should be interested in this work?" My reply is that to judge the value of a particular market it is not sufficient to speak in terms of turnover; one must speak in terms of margins both per unit and in sterling, and this at any rate is pre-eminently the Cost Accountant's work. This being so, it is all-important to him that the information from which he is to get his figures shall be so handled in the first place, whether by Hollerith or some other machine, that the figures he requires may easily be ascertained. I say he needs to talk in terms of margin. This means not only gross margin, but net margin, after an adequate deduction for selling expenses in commodities and in markets. The Cost Accountant will find many things to trouble him before he gets these figures perfect—such as the proper analysis of selling expenses. This, however, is a pure problem in Cost Accountancy, and with which I do not propose to deal with to-night. My object rather is to point out, if I can, the uses which may be made of Cost Accountancy in assisting the directing policy of great enterprises. One may just say that every item of selling expense will need separate consideration and dealing with in accordance with its relation to its specific job, or as a general charge over the whole lot. The advantages of such a machine as a Hollerith are so great that it seems like telling a fairy tale to state the number of ways in which information can be shown up. One can summarize the margins on products and markets, in individual products under salesmen, or in any other ways of grouping which may occur to an ingenious mind.

It is true, of course, that the Cost Accountant cannot of himself supply that enterprising genius which will enable an Administrator to say what is to be done with a business, the market for whose goods has completely changed, whether due to a different direction of trade, due to turn to internal production in the country under consideration abroad, or to imports from another country, or still less, to those trades affected by changes in fashion. But though he cannot do this he can show his figures in such a way as to suggest the comparative merits of various agencies, of selling by travellers, or the efforts of individual salesmen or individual Branches. In fact, the administrator who turns to the selling side of his business can only be described as excessively foolish if he does not make use of the Cost Accountant at every end and turn. My own view is that Cost Accountants do not sufficiently investigate this side of the business, nor do administrators make sufficient use of them. Summarizing these brief remarks, therefore, one may say that the Cost Accountant is of great use in modern business enterprises from the administrative point of view whether one looks at the buying, producing, or selling side. By his training, he is able to sift out the truth and so to present it that it may suggest future policies.

I would like also to say again here something which I have said before on numerous occasions, and that is, that besides the specific use which can be made of the Cost Accountant in dealing with isolated cases of costs or special problems of selling or producing, I believe that Cost Accountancy does something else for the modern Administrator.

The discovery of the places to which energy may best be displayed is a matter of patient and quiet thought, illuminated by the best classified information which one can bring to bear upon the subject. I suggest that a severe course of "costing" will clear the brain of the Administrator of a lot of half-thoughts and slipshod thinking and that the Cost Accountant, if allowed the opportunity, will help to achieve that end.

I suggest that there is a separate science of administration altogether apart from technical management. It is too often thought that anyone who is a technical expert at the business in question will make a good manager. But this does not always follow. It is much more important to-day that an Administrator should be a man of personality, trained in economics and the use of statistics, and have a way with him of winning men, rather than he should be merely, say, an expert chemist.

The great administrator to-day indeed needs almost the mind of a statesman. If, as is most likely, he is concerned with international trade, he needs to consider in a broad way foreign affairs—economic and political—tariffs and the course of exchange. At home he will find himself deeply implicated in the labor-world, with all its strife, antagonism, disputes and strikes. He needs frequently first-hand knowledge of world-resources, in raw or crude material — an exact knowledge of produce markets or the state of the fundamental industries, and according to the type of his business, he needs to keep abreast of the best scientific thought in chemistry and engineering. In addition to all this, he is the trustee for large bodies of men, women, youths and girls, a large portion of whose lives and the conditions under which they work is under his care.

These are problems enough to stagger any man, and he needs a training for it. In a recent article in an American Review there is a paper on "Our Emerging Business Aristocracy," in which the writer points out that whilst formerly, the direction of business enterprises was almost entirely in the hands of the owner, it is tending more and more to fall into the hands of paid, and often highly paid, officials. It means the emergence of a new business

professional class of administrators and managers, who shall be properly trained for their job. A man can no more manage a large business enterprise merely because his father could, then he can play a Beethoven sonata merely because his mother could! The old idea of allowing a man to manage a business any way he liked, because it was "his own," is passing away. Great Limited Companies of to-day are owned, in many cases, by thousands of shareholders who have little individual interest in the concern, and the management of these concerns, with all their vital and far-reaching interest, is vested in a body of men for whom, hitherto, no special training has been required, but, who, through individual genius and success in certain possibly unlike directions, have resulted in their promotion. The whole of what I am trying to say may be summed up by saying that the more training and education which these administrators or managers have, the more they will appreciate and the more use will they make of such an official as the Cost Accountant, carefully trained in realms of exact thought, capable of visualizing at any rate a large part of their problems and capable of establishing the facts on which they need to build their policies; constantly drawing up and preparing statements of the continually changing business facts, which the Administrator most needs to grasp. Curiously enough it is the *less well-trained business men* who have apparently the least use for Cost Accountants—a curious psychological fact—not the keenest men!

Of course, it goes without saying that if these Cost Accountants are to do these things two other things at least are necessary—they must be properly educated and trained for their job and *their status and place in industry must be properly recognized.*

The Institute has done a lot towards improving the education of Cost Accountants and by setting high standards is endeavoring to do more. Whilst anxious for public recognition of Cost Accountants' it is anxious that Cost Accountants should render themselves worthy of that recognition.

The two things are inseparably joined. You cannot have recognition without trained ability worth recognizing, and if you have the men of ability, you won't have them very long without they are recognized, and their status and an adequate remuneration is guaranteed.

Therefore there is a call to Cost Accountants for a wider outlook and more extensive education, and to the business public for a more open mind in their use.

May I, before sitting down, utter one word of warning in begging any Administrator in considering any business problem, not to begin by forming his conclusions, and then looking for evidence in support of them, and later refusing to look at the evidence forth-coming, if it is against his pre-conceived notions, but to take the opposite course, and, having formulated his tentative ideas, get his evidence from his Cost Accountant, and only allow his ideas to crystallise or take root when he finds that they are supported by facts. In other words, to clear his mind of pre-conceived and possibly erroneous notions, to face the truth of facts manfully, and to go forward believing that the truth and the truth alone, will bring him success.

(*With acknowledgment to the Institute of Cost and Works Accountants.*)

Practical Cost Accounting

By F. C. LAURENCE, A.C.A.

Member of the Institute of Cost and Works Accountants

THERE are many sides or aspects of Costing which have not yet received the attention or investigation which they not only merit, but which they demand. We must admit that we have taken for granted that certain methods of costing are fundamentally sound, merely because they appear to be. We have not in all cases proved our methods. The time will come when we shall no longer be able to justify our existence as Cost Accountants unless we produce proof of the validity of every one of our methods. But, at the present time, there are matters of more pressing urgency.

Whether we be employed as consultants or as permanent officials of companies, our work consists of the design, installation and effective use of sound methods of Costing. Do we all realize that we have to sell our services?

Manufacturers do not endeavor to find their costs merely as a pastime, nor even to satisfy their love of statistics. They will only introduce a Cost System, or continue to maintain one, if it will remove uncertainty from their estimating, establish their selling policy, and enable them to effect savings greatly in excess of the money they are called upon to expend in its installation and maintenance.

At the present moment, it is the last condition, the saving of expense, that is the most important to them, and at the same time to us, both individually and collectively.

Furthermore, the majority of manufacturers today do not realize the extent to which Costing can definitely help them to bring about extensive economies. They do not see that Costing can be more effective in that direction than Financial Accounts. They do not appreciate the essential differences between Costing and Accountancy. It is up to us to show them.

Some manufacturers go so far as to find out that their ordinary Financial Accounts do not provide them with the means of cutting down expenses in their factories, and they imagine that an extension of their system of accounting will give what they require. In fact, they ask their Auditors and Accountants to extend their accounts in certain directions and then dub the extension "Costing."

How many Cost Accountants realize what harm is being done to the still early growth of Costing by such abortive methods as Accounting-Costing? Perhaps it is somewhat unfortunate that we have incorporated the title "Accountant" in our own designation.

One of the greatest dangers is that such systems of "Costing" are allowed to develop until the firm finds itself reduced to manufacture simply in order to supply the so-called Cost Department with growing files of still-born statistics.

What else can result from such methods than sheer disgust on the part of the manufacturer and the wholesale scrapping of the ill-conceived "Cost System and Staff." Thus are the minds of many manufacturers becoming prejudiced against all who call themselves Cost Accountants, whether that title is used legitimately or not.

There are very many firms in this country who have, after the useless expenditure of money and time, arrived at such a stage and whose directors have foresworn for ever the cult of costing. Such firms present a closed door to the Cost Accountant, and there are many other firms which through ignorance or apathy have not come to appreciate the value of true costing. These firms present to us and to our Institute a problem the solution of which is not only necessary to the continued growth of our profession, but it is also a problem of national importance, if this country intends to overcome successfully the foreign competition which threatens our economic existence.

Are we in a position to face and to solve this vital problem? The purpose of this letter is to suggest a means whereby we shall at least be able to become possessed of the essential weapons for our fight for progress.

Very few men can go into a factory for the first time and, after a more or less casual look round, indicate straight-away where definite wastages of men, material, machinery and plant are occurring. On the other hand, most people who have been brought up in a business and, in the course of time, attained possession of that business, think that, with their intimate knowledge, they have effected all possible economies. They cannot realize that the presentation of their result in terms of £. s. d., as only the trained Cost Accountant can present them, will lead to savings far in excess of the outlay upon sound Costing. Moreover, it is exceedingly difficult to convince them that such wonders can be brought about, before the results have been analyzed.

There lies within the experience of every Cost Accountant worthy of the name a number of examples of savings which have been effected by his own endeavors, processes which have been cheapened, wastages which have been traced and eradicated, machinery which has been employed with greater advantage, and other kinds of cost reduction which, even to the trained eye of the owner or manager, have not been obvious, until the costs have brought them to light. It lies within the scope of few, however, to be able to cite such personal experiences for more than one or two factories, or a few different industries, whereas the need for costing is apparent in every trade and in every factory in the country.

But, taken all together, the experience of the members of the Institute should cover the majority of trades, and it is suggested that if they were collected for the use of any member who wishes to use them they would constitute an irresistible weapon which would pierce the hearts of the most apathetic and the most hardened manufacturers.

This, then, is the call to arms; that every member of the Institute should collect all the examples of cost reduction in which he has had a hand, write them up, stating the methods employed, the savings made, either in a lump sum or annually recurrent, and forward his reports to the Institute, so that the whole may be collected into suitable form, indexed as to trades and methods, and made available for reference. They might even be published in "The Cost Accountant." The interchange of ideas and experiences thus accomplished would, incidentally, add zest to our own activities and make us all more eager to find out where we can extend our influence and accomplish more in our own particular spheres.

It is easy to suggest such schemes, but to carry them out demands the co-operation of the whole of the members of the Institute. There is, in each one of us, to a greater or less degree, an inevitable inertia, which tends to make us prefer to applaud the efforts of others, rather than exert ourselves. This must be overcome. If there are any who read this and should happen to think "That is a sound idea," let them bestir themselves, without delay, and

do their part, before they are overcome by the comfort of their office chairs. However sound and well-established your own job may be, the advance of Costing depends to some extent upon you. In fact, because you are well-established is the very reason why you should do something to help others to become so, by telling them how you managed it! You have it within your power to inspire the younger members of the profession, in whom the future prosperity of the Institute and its work rests.

Many who should be vitally interested do not know the very definite advantages to be derived from accurate and proved methods of Costing; others are apathetic; others again are satisfied with inferior grade methods; we are faced with competition which, left unchallenged, will ruin our chances of advancement; our experience can be made of untold value to the rising generation of Cost Accountants. We have to sell our services, our experience and our ability. In order to sell, we must advertise. Give, then, to the Institute and your fellow members, what is necessary for advertisement.

(Reprinted with acknowledgment to "The Cost Accountant".)

Candid Cost Criticisms

By A. JONES, A.C.W.A.

[*Paper Read to Liverpool Branch of the Institute of Cost and Works Accountants.*]

I MAKE no apology for reading this paper. We are all apt to regard Costing as a perfect thing and grow very eulogistic in its praise. Other sections of the industrial world do not see it in such a rosy light, and sometimes regard us as a necessary evil, tolerated but not admired.

Robert Burns' well-known invocation freely translated into modern English reads: "Give us the gift to see ourselves as others see us." I therefore propose to submit criticisms, partly from outside the Cost Office door and partly from inside.

I once read a gem of incisive reasoning something after this fashion: "The surgeon ought to be satisfied with his job. If he wants extra income he singles out his best-nourished patron, with an overload bank balance, prods him well till he squeals, and utters 'appendicitis, immediate operation,' which is a high-powered salesmanship. Can a manufacturer's salesman land an equal remunerative contract with equal ease? That's the difference between the lancet manipulator and the lancet maker. If that poor lancet manufacturer wants an extra five per cent. he has to spend a couple of weeks cost card joggling and shaking up heaps of figures, till finally, just as that elusive five per cent. is going to be grabbed, along comes the usual unexpected bill to gobble it up."

Now, I venture to suggest that whimsical as this sounds, there is a ring of truth in the suggested slur.

We have at various times had pertinent questions as "What is Whisky?" So perhaps I may receive your ultimate pardon if I ask "What is Costing?" I am sure that if it were possible to ascertain at one given moment various grades of factory executives' exact mental impression of "What is Costing?" the degree of non-coincidence would be appalling. Furthermore, manufacturers have in a good many instances installed costing systems in pre-war times simply because Messrs. Blank and Co. also had a Costing System; so there ought to be something in it. Let us put that pushing young bookkeeper on the job, so works were soon strewn as in a paper-chase with requisitions, forms, to be ultimately resolved by the budding Costing aspirant into the usual jungle of undigested numerals.

The war came and the Ministry of Munitions hit upon the cutest scheme yet evolved for enriching the manufacturer. It made the shareholders of many a struggling concern as happy as the operating surgeon alluded to above. No traveller or high-powered salesmanship necessary. You simply opened a Cost Department, got the necessary specifications and drawings and proceeded to bill up your munition account on the Cost plus profit basis. You see the more it cost, the greater your profit. Even if the price was fixed beforehand it was usually on the basis of Costs of the least efficient factories. They had to live and the more efficient planned and managed concern reaped the greater benefit. Financial accountants were directing the account branch of the Ministry. Industrial Accountants with the production viewpoint were absent. So the Government had to bring in the famous "Excess Profits Tax" to take back what they had given away. If Costing had been efficiently done during the war period in so far as munition accounts are concerned, the E.P.D. would not have applied. But then we had a lot of double-entry merchants, steeped in all the traditions of depreciation, taxation, law and the like, who hardly knew the difference between a rivet and a bolt, and with untrained estimation ability, but who could discourse on depreciation, on interest on capital, with the erudition of a High Court Judge.

To-day we hear a lot of what is termed "scientific costing." It has become so familiar that constant reiteration has almost robbed us of its first significance. In what proportion of plants in this country is efficient costing employed, whereby the slightest variation from previously arrived at production standard is signalled to management? I am particularly referring to works making many products, each having a preponderance of operations and materials and dissimilar products, thereby producing an extremely complex situation. The single or dual product proposition is simple and simple accounting methods are all that are necessary here. You will find that in the multi-products works a layout of costing something after this fashion:—

Labor, Material, Indirect } Inter Part Cost Record for Stock.

Inter Part Cost Record prices at above on reissue from Stores.

Labor, Material, Indirect } Sub Assembly for Stock.

Sub Assembly at above Cost.

Labor, Material, Indirect } Final Assembly.

All that the above represents is a conglomeration of numerals involving data figured at various times embodying different wage scales and efficiencies, fluctuating material purchase prices, and indirect expenses, altered period by reason of expense, total variations and work altered facilities utilization. The acid test of the above is, Could the current cost of an article be compiled at to-day's values for the purpose of tendering or altering list selling prices? I think not, and yet this is a typical Cost Accounting plan, and seems to have inspired the medical parable with which this paper opened. The fact of the matter is that the *Costing superstructure has been grafted on to ordinary financial accounting and has been moulded in its routine with pre-existing practice.* The measure of production has been too often the selling price and not the production standard itself. It is this type of Cost Account that is too often used for the chastisement of works management by Boards of Directors, when probably the loss lay equally with the sales promotion force in obtaining orders by too vigorous price-cutting. Again, many Cost systems have been installed at great expense and subsequently scrapped because the management have despaired of ever obtaining *accounts that would help them in their functions.* The installation of a Cost System in a factory can never be automatic or standardized and the best one devised will not stand up for a single day without adequate supervision. There is no such thing as a Cost System which will completely fulfill every function, production, financial and check estimation. Eliminate the middle one and production and check estimation will run as a harmonious tandem. A perfect Cost System *from an Accounting standpoint* may be useless as an aid to management. The function of a Cost Accountant is to develop accurately and currently information as called for by operation sections, rather than beautiful charts and graphs which do not serve the man behind production. Works are run for making money—not for idealism—and the function of the Cost Accountant is to earn his commission by doing his bit in producing this profit and when he fails, his job is a passenger on the salary roll. Cost Systems don't appear in the balance sheet as tangible assets like buildings, etc. When they fail to produce extra profit they should figure as a balance sheet liability. This profit idea is true whether the factory is private or State-owned.

How many Cost Systems to-day would not utterly break down if the volcanic upheaval of price values, labor efficiencies that marked 1914-1923 recurred? At a time most of all when it is of the utmost importance to signal these violent fluctuations and adjust the catalogues accordingly, the Cost System may be severely damaged or even rendered impotent. Accuracy is all important, but to be of value at all it must appear at every stage. You would think it absurd for a machine-tool designer to allow a tolerance of one-hundredth in one part and one-thousandth in its complementary part. Yet there are many Cost Systems which split their pay-roll from grossly inexact sources, whitewashed boards, time tickets and the like, and to certain types of accounting minds this is in order because you see the total agrees with the pay-roll. In my opinion, there are only two ways, either alternate to other—the one card one operation clock card lasting for entire duration of job, whether one hour or a thousand, and the pricing and proration of the week's work against an accurate predetermined standard. Again, the correct identification and pricing of material requisitions is of primary importance. I venture to submit that in a great many present-day systems codification of expense heads is non-existent, so we have the disconcerting situation of different descriptions applied to one type of stores issue, with results that do not need further elaboration here—or where the usual plan of pricing and extending material requisitions is followed, instead of adjusting the predetermined material cost to actual by the variation cause ratios, the price taken is last buying price instead of the price in stock at opening of period plus subsequent purchases averaged. Again, we find that handed-down relic from the columnar analysis purchase journal bequeathed

from straight accounting, "SUNDRIES AND MISCELLANEOUS." Fourteen columns devoted to general headings—there is usually one called tools, and the fifteenth is the grave-yard of every expense that cannot by the greatest stretch of the imagination be pushed in the fourteen. So it cannot be wondered at that those whose functions it is to endeavor to salvage something from the accounts presented are very dubious of that nebulous item.

I now come to that cockpit of Cost Accounting—I hesitate to state what its correct nomenclature should be, because no authorities have yet agreed. It is referred to as Indirect, Overhead, Oncost, Burden, and perhaps there are others which are not recollected at the moment. If there is lack of uniformity in this elementary matter, still more so is the practical application of what up to now is the third leg of Costing. It is a condemnation of costing practice that these supposedly sharply demarcated divisions, Wages, Material and Indirect, should have been allowed to pursue their malignant growth into the corporate body of Industrial Accounts. No textbook is complete without the opening statement of *these three imaginary divisions.* It is the Cost Accountant's Athanasian Creed, although I am unaware of the penalties for disbelief and denial. The faults of the Indirect Method of Distribution may be tabulated as under:—

1.—Roundabout or wheel-within-wheel method, expenses are distributed and redistributed many times till they reach their final resting-place. Some weeks ago we had a discussion here on yard locomotive costs, so I have selected this to illustrate my meaning. The locomotive account has been debited with its proportion of, say, storekeeping expenses on its supplies. In turn, this storekeeping expense is added to the locomotive running expenses, which accumulated total is now charged to the Indirect of the sections this locomotive serves, thence to the product, or it may even be redistributed back to the stores material for haulage in. That bar of iron, storekeeping charge, has got home to where it started its business career. Pity the poor Manager who has to follow this will-o'-the-wisp in all its travels through the ledger pages. Bear in mind that the resultant accounts are aften reduced to varying unit costs, this month, last month, last year, and so on. The truth is that last year's costs are about of as much value as last season's birds' nests.

2.—Fixed and Fluctuating Expenses. It is the exception to find provision made in Cost Accounting plans for the segregation of these, yet it is vitally important. There are groups of expenses which sharply react to production variations, and others which are inert whether the factory is almost closed down or facilities overloaded, as when double shifts running when one shift is nomal. This correct focusing in the Cost Accounts of under or over utilization is of prime importance in the framing of tenders for work, and I think that some of the non-success of British firms in bidding for foreign orders is due to partial ignoring of this economic fact. However, the Cost Account should certainly reflect this all-important point.

Positions Desired

No. 253—Age 27. Experience as office manager with charge of general accounting and cost work, distribution and analysis of cost figures, monthly profit and loss statements. Acquainted with secretary-treasurer's duties. Salary, $2,500.

No. 254—Age 32, married, 10 years cost experience; last 8 years in full control cost department of large firm. Salary, $2,500.

No. 255—Age 36, married, 14 years cost accounting, covering installation of system, time study, payroll distribution, material control and productive work; comparative reports and monthly statements.

No. 256—Experienced Accountant, 5 years Chartered Accountant's office; full range of accountancy work including costing. Good references.

No. 257—Junior position—10 years' experience accountancy and cost work; cost estimation and analysis.

No. 258—Cost Accountant, at present in full charge of cost department; experience in different plants; also 4 years' general office work. Student of La Salle and Alex. Hamilton Institute.

No. 259—9 years in Maritimes; full experience casting valves and fittings, both brass and iron; competent in piece work and production management.

No. 260—22 years, single; 2½ years as assistant Cost Accountant in large box factory; general office experience and sales. Salary, $1,200 to $1,500.

No. 261—Age 24; six months' banking; 4 years in charge of books of branch factory, including costing, payroll work, customs and export, etc.; 2 years general office work; La Salle student in Higher Accountancy.

No. 262—Aged 35; married; 7 years' experience with firm of Chartered Accountants, including cost work. At present employed by manufacturing concern.